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U. S. Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE  
WEATHER BUREAU  
Washington

Office of the Chief

June 15, 1934.

CIRCULAR

INSTRUCTIONS FOR THE PREPARATION AND ISSUANCE  
OF AIRWAYS FORECASTS.

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Introduction.

Short-period airways forecasts have now been issued from certain designated airport stations for over four years. During the past two years a definite form and phraseology have been in use which made the forecasts uniform but too often rather long and involved. Since these forecasts are of great importance they should be as concise and definite as it is possible to make them. To this end the following revised instructions are issued and will become effective on July 1, 1934.

Copies of this Circular should be made available to officials of air transport companies, pilots, and others interested, in order that they may become familiar with the meaning and scope of terms and expressions used.

The Circular, dated April 1, 1932, entitled, "Instructions For the Preparation and Issuance of Three-Hourly Forecasts" is hereby revoked.

I. DESCRIPTION OF THE GENERAL CHARACTER OF THE SHORT-PERIOD AIRWAYS FORECAST SERVICE.

1. The purpose of the airways forecast service is to provide short-period forecasts of weather elements having a direct bearing on the safety and efficiency of flying activities at regular intervals for all traffic over Federal or other airways in the United States. Because

of the short period covered these forecasts are relatively precise and definite, giving expected airways weather conditions in greater detail than is possible in the case of the daily forecasts covering an advance period of 24 to 36 hours.

2. Experience has shown that the short-period forecasts are much more useful when issued for definite airways than for regions or zones. The service will, therefore, be limited to forecasts for definite airways, except as specified in Section VII.

## II. GENERAL INSTRUCTIONS

3. The following elements will be included in each forecast:

- (a). Sky. (sky covering)
- (b). Weather (precipitation, thunderstorms, etc.)
- (c). Obstructions to Vision. (fog, smoke, haze, etc.)
- (d). Ceiling and Visibility

4. No forecast will be issued without containing specific mention of ceiling and visibility, except that when "clear" or "scattered clouds" are expected to obtain over the entire airway, no mention need be made of the ceiling, it being assumed that this will then be understood to be "unlimited".

5. Some latitude may be used in arranging the order of the elements discussed in the forecast. For example, it may be found advantageous in the interest of brevity to forecast all the elements for one section of the airway before passing on to the next section, or it may be more advantageous to forecast each element for the entire airway before passing on to the next element, or a combination of the two cases may be used. In any event, the two elements, ceiling and visibility, should whenever practicable, be forecast in one sentence for the entire airway or specific sections of the airway.

6. Each forecast will be complete in itself, i. e., it is not enough to say, "Little change indicated, etc.," as it is possible that the preceding forecast may not have been noted by the person desiring to use the current forecast.

7. It will be proper to indicate an expected continuation of current conditions by the use of such inferential terms as, "continued", "continuing", "persisting", etc.

8. The forecasts are to be as specific as it may be practicable to make them. The words "generally" and "mostly" should be used sparingly and the use of the modifying term "possibly", is not authorized for airways use. The use of the term "probably" will be limited to precipitation and then only in cases of extreme uncertainty.

9. The forecasts will be as brief as possible and worded in such a manner as to express their meaning clearly without the use of punctuation, except periods. The text of individual forecasts should not exceed five full lines of transmission on the page type teletype machine, if at all possible to avoid it.

10. Names of States or Counties for indicating sections of the airway being dealt with should not be used nor should the airway be divided into north, east, south or west portions, because such descriptions are too indefinite. Sections of the airway being dealt with will be indicated by specific mention of the names of towns or cities, landing fields, or geographical features on the airway. For example, "Clearing Ruby Mtns. eastward", "Ceiling will lower rapidly Mississippi Valley eastward", "Dense fog in and near Chicago", "Clear west of Omaha,"

11. Distribution will be accomplished by radio and teletype where practicable. Forecasts will not be transmitted at Government expense,

except under specific prior authority or in an emergency. In all other cases they will be furnished at the expense of the person requesting them.

12. Forecasts for a particular airway will be sent by the issuing station only along the airway for which they are intended, except as it may be necessary in reaching another airway. Relays by radio or teletype may then be arranged if practicable at the other stations concerned, subject to the usual procedure in such cases.

13. The current State forecasts and those issued 12 hours previously by the District Forecast centers will be used as a guide in all cases, particularly with regard to "weather" conditions.

14. The warning term, "CAUTION ADVISED" is authorized to be used if extremely unfavorable conditions are forecast. Judgment and discretion are to be exercised in the use of this term. Ordinarily it will be used infrequently but it will be considered justified when the following conditions are forecast.

Heavy snow, sleet or rain over extensive areas with zero ceiling and visibility; severe blizzard conditions; icing conditions or severe icing conditions; moderate or severe wind shift line. Severe thunderstorms with heavy rain or hail.

15. Forecasts will be made for all Federal airways assigned to the airway forecast center and will be issued for all periods as defined in Paragraph 18.

16. Special forecasts will be issued when extensive developments occur more rapidly than expected in the last regular forecast. The special forecasts shall not extend beyond the current period and the necessity for them should be of infrequent occurrence.

17. TRIP FORECASTS for periods not in excess of six hours from the time of issue may be made for routes other than those along Federal airways.

If trip forecasts for specified routes are to be issued regularly, recommendation for authority to do this will be made to the Central Office, i. e., occasional trip forecasts for a flight may be made without specific authorization in each case, but regular issue of forecasts for a specified route shall not be made without authority. It will be satisfactory to begin such service prior to receipt of authority from the Central Office only if time does not permit obtaining this. In no case will an official issue trip forecasts without having been previously authorized to make this type of forecast, excepting those officials who regularly issue short-period airways forecasts. The period of a trip forecast shall not cover more than six hours immediately following its issuance. Requests for forecasts for greater periods than this shall be referred to the District Forecast Center in which area the flights originate. Such cases will include extended flights along, as well as off, Federal airways. Requests for forecasts for flights originating, ending in, or involving foreign countries shall be referred to the Central Office. The point of departure, time of departure, route, destination and period to be covered should be supplied to the District Forecast Center or, in case of flights originating or ending in foreign countries, to the Central Office.

### III. PERIOD COVERED BY FORECASTS

18. The forecasts will cover a period of four hours beginning two hours after the regular collection periods at 4 and 8 a. m. and p. m. and Noon and Midnight, E. S. T.

### IV. FORECAST IDENTIFICATION HEADINGS

19. The forecasts as transmitted will be identified by headings in accordance with the following:

(a). Where only one forecast is involved the heading will consist

of the name of the airway using the recognized call letters for designation of the terminals; the period covered by the forecast on the basis of the 24-hour clock and local time; the abbreviation, "AWYS FCST"; and the month and day, using figures. For example:

CV WN 1800 2200ES AWYS FCST 10/16.....

This type of heading would also be used for "trip forecasts" except that the abbreviation "TRIP FCST" would be substituted for the one given above.

(b). Where a group of forecasts is to be transmitted, a general heading consisting of the time, the abbreviation "AWYS FCSTS" and the date, will be used for the group, and the individual forecasts therein will be indicated by the proper terminal designators. For example:

1800 2200ES AWYS FCSTS 10/16

CV WN.....

CV CG.....

CV NK.....

#### V. TERMINOLOGY

20. The terms, CLEAR, SCATTERED CLOUDS, BROKEN CLOUDS, OVERCAST, or any obstruction to vision such as DENSE FOG, THICK BLOWING DUST, etc., which may reduce the visibility to 1/5 mile or less and the ceiling to "zero", will be used to forecast the "sky" element. The terms will have the same limits and meanings as indicated in Circular N or Form 1133-Aer.

21. The "weather" element of the forecast will include types of precipitation and local atmospheric disturbances, as follows:

RAIN, SNOW, SLEET, SHOWERS (Light, moderate or heavy).

THUNDERSTORMS, mild, moderate or severe.

LIGHT OR HEAVY MIST.

SLEET.

SNOW FLURRIES, occasional light falls of snow.

SNOW or RAIN SQUALLS, or SEVERE SNOW or RAIN SQUALLS, if unusually heavy falls of snow or rain, accompanied by strong, gusty winds are foreseen.

MODERATE or SEVERE BLIZZARD CONDITIONS: When intensely cold north-easterly or northwesterly gales, accompanied by a greatly reduced visibility, or ceiling and visibility, due to the falling or blowing about of snow, or both, are foreseen.

ICING CONDITIONS, or SEVERE ICING CONDITIONS, if conditions are unusually favorable for the occurrence of this phenomenon. To be used when the temperature, amount of water vapor, or other factors, will be such as to favor the formation of ice on aircraft while in flight through clouds, freezing rain, (glaze), etc.

MILD, MODERATE or SEVERE WIND-SHIFT LINE will be always be forecast if this phenomenon is expected to move over the airway during the period of the forecast. The rate and direction of movement are to be indicated.

MILD, MODERATE or SEVERE SANDSTORMS or DUSTSTORMS: to be forecast when conditions are considered favorable for their occurrence.

Conditions not covered, but occurring at times, will be forecast in accordance with the judgment of the forecaster, following as nearly as possible the same line of thought as is expressed in the terms listed above.

TORNADOES are not to be forecast but when reported as occurring on or near the airway this fact will be stated in the next forecast.

22. The "obstructions to vision" element of the forecasts will be confined generally to the expected formation, continuation, or dissipation of FOG. It will be proper to mention "thick haze", "thick smoke", "thick

dust", "blowing snow", "blowing dust" and "blowing sand" as a continuing, moving or dissipating condition when these are present. "Hazy", "smoky", or "dusty" may be mentioned if considered important.

23. The same terms and limits will be used in forecasting fog, including ground fog, or when mentioning haze, smoke, etc., as are given for these phenomena in Circular N or Form 1133-Aer., or supplements thereto.

24. CEILING:- This element should be forecast with visibility when practicable. The use of the term "CAVU" (ceiling and visibility unlimited) is authorized, whenever the visibility is expected to be greater than 15 miles. and the ceiling to be unlimited.

25. In forecasting the ceiling use the following terms for expected values from zero to 1000 feet:

ZERO.....less than 100 feet.  
VERY LOW.....100 feet to 500 feet, inclusive.  
LOW.....over 500 up to and including  
1000 feet.

Ceilings above 1000 feet will be forecast by specifying the range of ceiling heights the forecaster has in mind.

Examples:

Ceiling 15 hnd to 2 thsd.  
Ceiling generally 3 to 4 thsd but lowering to 2 thsd  
to 15 hnd near etc.  
Ceiling low to very low near Kansas City 1 to 2 thsd  
other sections etc.  
Ceiling above 6,000 all sections.

The following terms are defined for use in describing expected changes during the period of the forecast:

SLOWLY LOWERING CEILING (Ceiling expected to lower becoming )  
(approximately 2/3 its initial height )  
(during the period )

MODERATELY LOWERING  
CEILING (Ceiling expected to lower, becoming )  
(approximately 1/2 its initial height )  
(during the period )

RAPIDLY LOWERING CEILING	(Ceiling expected to lower, becoming approximately 1/3, or less of its initial height during the period )
SLOWLY RISING CEILING	(Ceiling expected to rise becoming approximately 3/2 of its initial height )
MODERATELY RISING CEILING	(Ceiling expected to rise becoming approximately twice its initial height)
RAPIDLY RISING CEILING	(Ceiling expected to rise becoming approximately 3 times its initial height )

The above terms may be reversed, as for example. CEILING RISING MODERATELY.

26. VISIBILITY:- This will be forecast specifying the range of visibilities in miles when more than 2 miles. Example: VISIBILITY 2 to 6 MILES, etc. Visibilities less than 2 miles will be described in words as follows:

ZERO.....1/5 mile or less  
VERY LOW.....1/5 to 3/4 mile  
LOW.....3/4 to 2 miles.

Visibilities over 15 miles will be designated as "unlimited". The following terms, which have respectively the same change values as given for the ceiling terms in Paragraph 23, may be used when a change is expected to occur during the period:

SLOWLY DECREASING VISIBILITY  
MODERATELY DECREASING VISIBILITY  
RAPIDLY DECREASING VISIBILITY  
SLOWLY INCREASING VISIBILITY  
MODERATELY INCREASING VISIBILITY  
RAPIDLY INCREASING VISIBILITY

27. REMARKS:- These will form the last portion of the forecast when appropriate and will include forecasts of unusually strong winds, surface and aloft, rapid pressure changes, and field and landing conditions as discussed following:

(a). Wind:- Due to the large influence of local factors of terrain, etc., on the surface wind, this element will not be forecast unless velocities and gustiness, dangerous to aircraft landings, are foreseen. Winds aloft will not be forecast, except when unusual velocities are expected to occur, or a radical change in direction is expected to take place during the forecast period at levels below 14,000 feet above sea level. No terminology for wind forecasts is specified, but such terms as, "strong", "gales", "gusty", etc., are suggested.

(b). Pressure:- An expected rise or fall of one-tenth inch or more within the forecast period will be included and designated, "RAPIDLY RISING/FALLING PRESSURE".

(c). Field conditions will be included in the forecast whenever it is expected that a definite change toward better or worse conditions will occur generally within the forecast period.

#### VI. MISCELLANEOUS TERMS

28. The term "locally" is authorized for use whenever the condition referred to is of minor extent and is definitely located, as for instance, "locally low Lexington".

29. The term "occasional" is to be used whenever a condition is expected to occur at intervals.

30. An airway is to be considered as a strip 50 miles wide with the line of beacons along its center. The term "Scattered" in connection with forms of precipitation may be used.

#### VII. SPECIAL AIRWAYS SUMMARIES

31. At forecasting centers where there is not sufficient qualified personnel to maintain 24-hour forecasting service, it will be proper dur-

ing the forecast periods in which this condition exists for the personnel to issue summaries of current conditions along the airways assigned, using the terminology above outlined, and substituting the term "AWYS SUMMARY" in the heading. No forecasts are to be included in the summaries when issued by personnel not authorized to make such forecasts. At stations where there are three or more employees in the Professional grades or other grades who have been authorized to make forecasts, there will be no justification for the issuance of summaries at any time.

VIII. AUTHORIZATION

32. Only employees in the Professional grades, having had at least two years' practice forecast work with a satisfactory record will be authorized, as a rule, to issue forecasts. Professional employees now assigned to stations for the purpose of issuing airways forecasts were indirectly authorized at the time they were assigned. Upon receipt of this Circular, however, each station will report the name, grade and approximate number of forecasts issued each week by each employee charged with this responsibility. Other employees will not be permitted to make forecasts without specific authorization from the Central Office.

IX. RECOMMENDATIONS

33. If new airways are established or old ones discontinued in a forecasting area, the airways forecast center concerned will make recommendation to the Central Office for the issue or discontinuance of issue of forecasts covering these airways.

X. EXAMPLES OF FORECASTS

34. The following examples are intended to illustrate the proper usage of terms and possible methods of concise and clear rendition of forecasts:

(a). Clear weather forecasts:

CV WA 1800 2200ES AWYS FCST 4/16 CLEAR. VISIBILITY 6 to 10 MILES EXCEPT SMOKEY VISIBILITY ABOUT 3 MILES PITTSBURGH.

NK BW 1400 1800ES AWYS FCST 2/19 CLEAR TO SCATTERED CLOUDS. CAVU.

(b). Fog forecasts:

AG WA 0200 0600ES AWYS FCST 5/18 CLEAR. DENSE GROUNG FOG ALL STATIONS SPARTANBURG NORTHWARD. VISIBILITY ABOVE GROUND FOG 10 to 15 MILES.

CV NK 0200 0600ES AWYS FCST 3/24 DENSE FOG HEAVY MIST CEILING AND VISIBILITY ZERO ENTIRE ROUTE. SOME IMPROVEMENT CLEVELAND TO WARREN NEAR END OF PERIOD.

(c). Broken clouds with some limitation of visibility.

OH CG 0900 1300CS AWYS FCST 6/14 BROKEN CLOUDS BECOMING OVERCAST NEAR OMAHA AT END OF PERIOD. CEILING 3 TO 5 THOUSAND. HAZY VISIBILITY 3 TO 5 MILES.

(d). Precipitation forecasts:

RW JX 0200 0600ES AWYS FCST 4/22 OVERCAST WITH LIGHT RAIN OR MIST PERSISTING. CEILING AND VISIBILITY LOW TO VERY LOW JACKSONVILLE TO CHARLESTON. CEILING 1 THOUSAND AND VISIBILITY 2 MILES OR MORE NORTH OF CHARLESTON.

CG CV 1800 2200ES AWYS FCST 5/16 OVERCAST WITH HEAVY RAIN AND SEVERE THUNDERSTORMS. SEVERE WIND SHIFT LINE WILL REACH WEST END OF AIRWAY SECOND HOUR OF PERIOD AND PROGRESS EASTWARD REACHING TOLEDO DURING LAST HOUR. CEILING AND VISIBILITY ZERO IN HEAVY RAIN AREAS AND 15 HUNDRED FEET AND 2 TO 3 MILES ELSEWHERE. STRONG GUSTY WINDS SURFACE AND ALOFT. CLEARING CHICAGO TO SOUTH BEND END OF PERIOD. CAUTION ADVISED WIND SHIFT AREA.

RO SL 1200 1600MS AWYS FCST 1/14 OVERCAST WITH HEAVY SNOW CEILING AND VISIBILITY VERY LOW OR ZERO RENO TO RUBY MOUNTAINS THENCE OVERCAST EASTWARD WITH LIGHT SNOW CEILING 1 THOUSAND FEET OR BETTER AND VISIBILITY 2 TO 3 MILES. OCCASIONAL SEVERE SNOW SQUALLS IN MOUNTAINS. CAUTION ADVISED.

(e). Example of an extremely long forecast:

CV NK 1800 2200ES AWYS FCST 1/31 CLEAR CAVU CLEVELAND TO BROOKVILLE. SCATTERED TO BROKEN COULDS BROOKVILLE TO BELLEVILLE CEILING 3 THOUSAND BELLEVILLE. HEAVY SNOW AND SEVERE ICING CONDITIONS BELLEVILLE EAST TO PARK PLACE CEILING AND VISIBILITY ZERO ALL RIDGES THENCE OVERCAST AND LIGHT

SNOW CEILING AND VISIBILITY LOW TO NEWARK FIRST HALF OF PERIOD BECOMING WORSE LATTER HALF. GRADUAL IMPROVEMENT BELLEFONTE TO SUNBURY LATTER HALF OF PERIOD. CAUTION ADVISED BELLEFONTE EASTWARD.

XI. ASSIGNMENT OF AIRWAYS FOR FORECASTING PURPOSES.

- |             |  |
|-------------|--|
| Atlanta     | - Atlanta-Jackson<br>Atlanta-New Orleans<br>Atlanta-Nashville<br>Atlanta-Washington<br>Atlanta-Jacksonville<br>Richmond-Jacksonville<br>Jacksonville-Miami   |
| Burbank     | - Burbank-San Diego<br>Burbank-El Paso<br>Burbank-Albuquerque<br>Burbank-Las Vegas   |
| Chicago     | - St. Louis-Indianapolis<br>Chicago-Fargo<br>Chicago-Cincinnati<br>Chicago-Louisville (Combined with Chicago-Cincinnati)<br>Chicago-Memphis<br>Milwaukee-Muskegon<br>St. Paul-Sioux City   |
| Cleveland   | - Cleveland-Chicago<br>Detroit-Muskegon<br>Detroit-Chicago<br>Cleveland-Detroit (over lake)<br>Cleveland-Nashville<br>Indianapolis-Pittsburgh<br>Cleveland-Washington<br>Cleveland-Newark<br>Cleveland-Albany<br>Camden-Pittsburgh |
| Dallas      | - Dallas-Nashville<br>Dallas-Jackson<br>Dallas-New Orleans<br>Dallas-Brownsville<br>Dallas-El Paso<br>Dallas-Amarillo<br>Memphis-New Orleans   |
| Kansas City | - Kansas City-St. Louis<br>Kansas City-Albuquerque<br>Kansas City-Omaha-Bismarck<br>Omaha-Chicago<br>Omaha-Cheyenne<br>St. Louis-Tulsa<br>Kansas City-Dallas<br>Kansas City-Chicago  |

Newark	- Newark-Boston Newark-Washington Newark-Albany Albany-Montreal Albany-Boston Boston-Montreal Boston-Bangor
Oakland	- Oakland-Reno Oakland-Burbank Oakland-Medford Reno-Salt Lake City
Portland	- Portland-Seattle Portland-Spokane Portland-Medford Seattle-Spokane Pendleton-Salt Lake City
Salt Lake City	- Salt Lake City-Cheyenne Cheyenne- Albuquerque-El Paso Salt Lake City-Great Falls Salt Lake City-Las Vegas Cheyenne-Billings

W. R. Gregg,  
Chief of Bureau.

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UNITED STATES DEPARTMENT OF AGRICULTURE  
WEATHER BUREAU  
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December 1, 1934.

CIRCULAR LETTER

Inclosed herewith are revised pages 3 to 6 inclusive, of the Circular entitled "Instructions for the Preparation and Issuance of Airway Forecasts" dated June 15, 1934. The old pages 3, 4, 5, and 6 should be destroyed and the new pages inserted in the Circular.

Instructions have been issued to use the word "Airway" as a singular instead of a plural attributive noun. The letter "s" should therefore be crossed out wherever the word "airways" is used in the circular as an attributive noun. For example, "airways forecasts" should be "airway forecast" and the abbreviation "AWYS FCST" should be "AWY FCST".

*W.R. Gregg*

W. R. Gregg,  
Chief of Bureau.

